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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/817,200	03/31/2004	Frederick J. AmRhein	ASMEX.366A	2193
20995 7590 03/02/2007 KNOBBE MARTENS OLSON & BEAR LLP 2040 MAIN STREET FOURTEENTH FLOOR IRVINE, CA 92614			EXAMINER LUND, JEFFRIE ROBERT	
			ART UNIT	PAPER NUMBER
			1763	
SHORTENED STATUTORY PERIOD OF RESPONSE		NOTIFICATION DATE	DELIVERY MODE	
3 MONTHS		03/02/2007	ELECTRONIC	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 03/02/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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eOAPilot@kmob.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/817,200	<b>Applicant(s)</b> AMRHEIN ET AL.	
	<b>Examiner</b> Jeffrie R. Lund	<b>Art Unit</b> 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 December 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 48-59, 64 and 66-73 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 48-59, 64 and 66-73 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 48-52, 54, 55, 57, and 58 are rejected under 35 U.S.C. 102(e) as being anticipated by Okuda et al, US Patent Application Publication 2003/0213435 A1.

Okuda et al et al teaches a process chamber 20 that includes: a first inlet 41 leading directly into the process chamber; an outlet 40 defining a flow path between the first inlet 41 and outlet 40; a second inlet (nozzle) 30 leading directly into the processing chamber and includes a throat (at the lower edge of the nozzle adjacent the chamber wall) and a mouth (horizontal sidewalls); a remote plasma generator 37; a channeling duct configured to channel the plasma generator product to the inlet via throat; and a plate located between the throat and mouth of the inlet, having at least one opening 34 and blocking areas to control the flow geometry of the plasma generator product to produce a non-uniform flow. The mouth of the second inlet is larger than its throat. The second inlet is positioned to open into the flow path between the first inlet and the second inlet (Figure 1-4, 6A, and 6B).

3. Claims 48-50, and 53 are rejected under 35 U.S.C. 102(e) as being anticipated

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by Thakur et al, US Patent 7,175,713 B2.

Thakur et al et al teaches a process chamber 101 that includes: a first inlet 131A, 131B leading directly into the process chamber; an outlet 109A defining a flow path between the first inlet 131A, 131B and outlet 109A; a second inlet 133 leading directly into the processing chamber; a remote plasma generator 170; a channeling duct 156 configured to channel the plasma generator product to the inlet; and an inlet insert 130A to produce uniform flow. The second inlet is positioned to open into the flow path between the first inlet and the second inlet (Figure 5).

4. Claims 64, 66, and 68 are rejected under 35 U.S.C. 102(e) as being anticipated by Ahn, US Patent 6,852,167 B2.

Ahn teaches an apparatus for use in a process flow control system having a process chamber 134.1, an inlet 132.2 and a channeling duct 136 comprising: an oval inlet plate 132 (column 3 line 45) configured to disrupt a reactive flow flowing through the inlet into the process chamber, the inlet plate comprising a flow blocking section (solid part of plate 132) and an circular opening 132.1 in the middle of the inlet plate. The flow blocking section and the opening are together configured: to alter a path of the reactive flow such that the reactive flow widens as it issues from the inlet relative to a flow pattern from the inlet in the absence of an inlet plate; and to produce a uniform reactive flow geometry. The flow blocking section includes shallow recess 132.2 and protrusion that extend toward the elongated axis.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

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obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 53, 56 and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okuda et al, US Patent Application Publication 2003/0213435 A1.

Okuda et al was discussed above.

Okuda et al differs from the present invention in that Okuda et al does not teach that the plate forms uniform flow geometry, that the plate is located in between the mouth and throat, or that the second inlet has a conical profile.

The flow geometry is dependent on the process and processing chamber. Uniform flow geometry is used for forming uniform layers on the substrate. The location of the plate with respect to the mouth of the inlet, and the shape of the showerhead are all factors in the flow geometry and are used to optimize the flow geometry.

The motivation for optimizing the holes, location of the plate, and shape of the showerhead is to optimize the flow geometry for the inlet to create the desired flow geometry.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to form a uniform flow geometry by optimizing the size and shape of the holes, the location of the plate, and the shape of the showerhead.

7. Claims 67 and 69-73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahn et al, US Patent 6,852,167 B2

Ahn et al was discussed above.

Ahn et al differs from the present invention in that Ahn et al does not teach that the plate forms non-uniform flow geometry, or various locations and shapes of the opening and flow blocking section.

The flow geometry is dependent on the process and processing chamber. Non-uniform flow geometry is used to correct for variations in the treatment of the substrate caused by non-uniform heating or gas concentrations. It is modified to produce the desired flow geometry to provide the optimum reactive gas distribution to optimize the uniformity of the treatment performed on the substrate. The location and shape of the opening and flow blocking section are factors in the flow geometry and are used to optimize the flow geometry.

The motivation for optimizing the location and shape of the opening and flow blocking section is to optimize the flow geometry for the inlet to create the desired flow geometry.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to form non-uniform flow geometry by optimizing the location and shape of the opening and flow blocking section.

### ***Response to Arguments***

8. Applicant's arguments, see arguments directed to Shang et al and Park, filed December 18, 2006, with respect to the rejections of the claims under Section 102 in view of Shang et al and Park have been fully considered and are persuasive. The rejections of the claims under section 102 in view of Shang et al and Park have been withdrawn.

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9. Applicant's arguments, see arguments directed to Shang et al on page 10, filed December 18, 2006, with respect to the rejection of claims 54 and 57-59 under Section 103 in view of Shang et al have been fully considered and are persuasive. The rejection of claims 54 and 57-59 under section 103 in view of Shang et al has been withdrawn.
10. Applicant's argument, see page 9 second full paragraph, filed December 18, 2006, with respect to the rejection of claim 64 under Section 102 in view of Okuda et al have been fully considered and are persuasive. The rejection of claim 64 under section 102 in view of Okuda et al has been withdrawn.
11. Applicant's arguments with respect to claims 48-59, 64, and 66-73 have been considered but are moot in view of the new grounds of rejection.
12. Applicant's arguments filed December 18, 2006 have been fully considered but they are not persuasive.

In regard to the argument that:

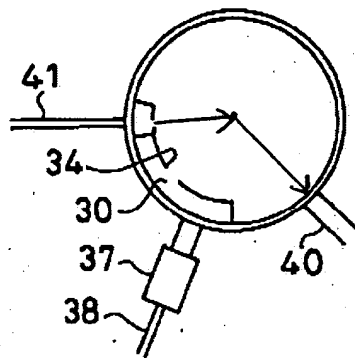
Okuda et al. fails to disclose that "the second inlet is positioned to open into the flow path between the first inlet and the outlet," as recited in Claim 48 as amended. Okuda et al. states that "the first gas supply tube 41 is connected to one side of the reaction tube 32 ..., and the second gas supply tube 38 is connected to the one side of the reaction tube 32." See id. at paragraph [0040]. In addition, Figure 6B of Okuda et al. depicts that the first and second gas supply tubes 41, 38 are connected to one side of the reaction tube 32. See id. at Figure 6B. Access holes for the first and second gas supply tubes 41, 38 are positioned proximate to each other, both facing a boat 39 where wafers are stacked. See id. at Figures 6A and 6B. Given this configuration, the access holes would generate two flow paths which independently lead to the boat 39. Therefore, the access holes 34 for the second gas supply tube 38 are not positioned to open into a flow path between the access holes for the first gas supply tube 41 and the exhaust tube 40. Nor are the access holes for the first gas supply tube 41 positioned to open into a flow path between the access holes for the second gas supply tube 38 and the exhaust tube 40. Therefore, Okuda et al. does not disclose the position of the second inlet, as recited in Claim 48.

The Examiner disagrees.

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As shown in figure 6B, the first gas inlet 41 and the gas exhaust 40 form the first flow path. The gas is injected from 41 toward the center of the wafers in the wafer boat and then flows to the gas exhaust 40.

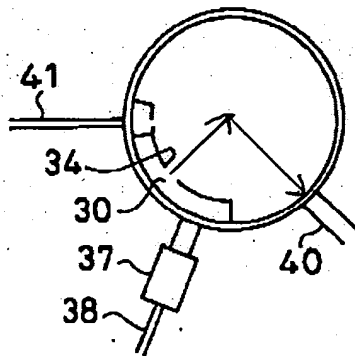
FIG. 6B



FIRST GAS FLOW

The second inlet 30 also injects gas toward the center of the wafers in the wafer boat that then flows toward the gas exhaust.

FIG. 6B



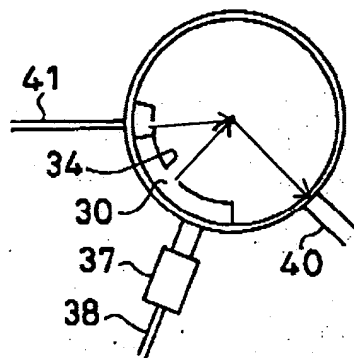
SECOND GAS FLOW



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Because the first inlet is further from the gas exhaust and the inlets are directed to the same point, the gas flow from the second inlet must open into the gas flow path formed by the first inlet and the gas exhaust.

FIG. 6B



COMBINED GAS FLOW

Therefore, Okuda et al teaches all the claimed limitations.

### **Conclusion**

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any


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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrie R. Lund whose telephone number is (571) 272-1437. The examiner can normally be reached on Monday-Thursday (10:00 am-9:00 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
Jeffrie R. Lund  
Primary Examiner  
Art Unit 1763